CLAIMS

What is claimed is:

1. A disk drive assembly comprising:

a spindle adapted to rotate about a longitudinal axis;

data storage disks surrounded by fluid medium, each of the disks having a disk outer edge and a disk inner edge, the disks being mounted on the spindle to rotate therewith about the spindle longitudinal axis, rotation of the disks in a first direction creating a flow of the fluid medium in the first direction, at least one of the disks having approximately concentric tracks disposed at different radial positions between the disk outer edge and the disk inner edge;

slider assemblies, each slider assembly including at least one transducer head capable of reading and writing information on one of the disks;

an actuator assembly for positioning the slider assemblies over the tracks;

a baffle disposed upstream of the actuator assembly, the baffle extending in a direction of the spindle longitudinal axis and having an inner surface disposed at least one millimeter outside of the outer edges of the disks; and

combs mounted on the baffle, at least one of the combs:

disposed adjacent to at least one of the disks to form a gap between the comb and a corresponding adjacent disk, the gap disposed in the direction of the spindle longitudinal axis and in a range from approximately 0.1 millimeter to approximately 20 millimeters;

extends radially inward from a comb outer edge to a comb inner edge , a portion of the comb outer edge disposed at the inner surface of the baffle;

disposed upstream of a corresponding actuator assembly;

extending in a disk circumferential direction from a leading edge to a trailing edge, the leading edge disposed upstream of the trailing edge; and

extending radially inward from the baffle.

2. The disk drive assembly of claim 1, wherein the baffle comprises a baffle plate.

3. The disk drive assembly of claim 2, wherein the baffle plate and the combs are elements of an integral mechanical structure.

4. The disk drive assembly of claim 1 including a second set of combs extending radially inward from an outer attachment element inner surface, the outer attachment element inner surface having a diameter not less than the outer edge of the disks, each of the second set of combs:

disposed in a position adjacent at least one of the disks in the direction of the spindle longitudinal axis; and

disposed downstream of the slider assemblies.

5. The disk drive assembly of claim 1, wherein at least one of the combs comprises more than one element, at least two of the comb elements are separated from each other by an intra-comb gap, the intra-comb gap extending radially from approximately the comb inner diameter to approximately the comb outer diameter.

6. The disk drive assembly of claim 1, wherein at least one of the combs comprises a single integral structure.

7. The disk drive assembly of claim 1, wherein at least one of the combs has a thickness that increases from the leading edge to the trailing edge.

8. The disk drive assembly of claim 1, wherein at least one of the combs has a thickness that increases from the comb inner diameter to the comb outer diameter.

9. The disk drive assembly of claim 1, wherein the gap between at least one of the combs and the corresponding adjacent disk is less than approximately 0.4 millimeters.

10. The disk drive assembly of claim 1, wherein the at least one of the combs extends radially inward form the baffle more than approximately ten percent of a distance between an inner edge and the outer edge of the corresponding adjacent disk.

11. A disk drive assembly comprising:

a spindle adapted to rotate about a longitudinal axis;

data storage disks surrounded by fluid medium, each of the disks having a disk outer edge and a disk inner edge, the disks being mounted on the spindle to rotate therewith about the spindle longitudinal axis, rotation of the disks in a first direction creating a flow of the fluid medium in the first direction, at least one of the disks having approximately concentric tracks disposed at different radial positions between the disk outer edge and the disk inner edge;

slider assemblies, each slider assembly including at least one transducer head capable of reading and writing information on one of said disks;

an actuator assembly for positioning the slider assemblies over the tracks;

a comb fixture disposed apart from the actuator assembly, and having an inner surface

separated by a first distance from the outer edges of the disks, the first distance greater than approximately one millimeter;

combs coupled with and extending inwardly from the comb fixture, at least one of the combs:

disposed adjacent to a corresponding adjacent disk to provide a gap between the comb and the corresponding adjacent disk, the gap disposed in the direction of the spindle longitudinal axis and in a range from approximately 0.1 millimeters to approximately 20 millimeters; and

extending circumferentially around the spindle longitudinal axis.

12. The disk drive assembly of claim 11 including a baffle disposed outside the disk outer edges and having an edge spaced closely to a segment of the disk outer edges, and wherein a first portion of the at least one comb extends radially inward beyond the outer edge of the corresponding adjacent disk, and a proximal edge of the first portion extends circumferentially towards the actuator assembly forming a gap between the proximal edge and the baffle of no less than ten millimeters.

13. The disk drive assembly of claim 11, wherein each of the combs includes:

a first portion having an outer diameter approximately equal to the comb fixture inner surface; and

a second portion extending closer to the slider assemblies and having an outer diameter less than the comb fixture inner surface.

14. The disk drive assembly of claim 11, wherein the gap between at least one of the combs and the corresponding adjacent disk is less than approximately 0.4 millimeters.

15 The disk drive assembly of claim 11, wherein the at least one of the combs extends

radially inward form the baffle more than approximately ten percent of a distance between an inner edge and the outer edge of the corresponding adjacent disk.

16. A disk drive assembly comprising:

a spindle adapted to rotate about a longitudinal axis;

at least one data storage disk having an outer radial edge, an outer surface, an inner radial edge, and an inner surface, the at least one disk being mounted on the spindle to rotate therewith, the outer surface and the inner surface approximately perpendicular to the longitudinal axis;

at least one slider assembly, each slider assemblies including at least one transducer head capable of reading and writing information on an adjacent disk;

an actuator assembly for positioning the slider assemblies over concentric tracks disposed at different radial positions on the adjacent disk; and

at least one enclosure element comprising at least one of:

a first large portion and a depressed contoured portion with a depressed region, and

a second large portion and a protruded contoured portion with a protruded region,

wherein the first large portion has a surface proximal to an adjacent disk outer surface and disposed longitudinally outside the actuator assembly to form a gap in approximately the longitudinal direction between the first large portion proximal surface and the adjacent disk outer surface of at least approximately 0.1 millimeter, and the depressed contoured portion disposed circumferentially adjacent to and upstream of the actuator assembly, the depressed region disposed closer to the adjacent disk outer surface than the first large portion, the first large portion covers more than approximately three times the amount of the adjacent disk outer surface covered by the depressed region; and

wherein the second large portion has a surface proximal to the adjacent disk outer

surface and forms a gap in approximately the longitudinal direction between the second large portion proximal surface and the adjacent disk outer surface of no more than approximately 20 millimeters, the protruded region disposed longitudinally outside the actuator assembly, the protruded region has a width outside the outer edge of the adjacent disk greater than a width of a portion of the actuator assembly adjacent and longitudinally interior of the protruded region, the protruded region disposed farther from the adjacent disk outer surface than the second large portion, the second large portion covers more than approximately three times the amount of the adjacent disk outer surface covered by the protruded region.

17. The disk drive assembly of claim 16, wherein a distance between the depressed region and the outer surface of the disk is less than approximately 0.8 millimeters.

18. The disk drive assembly of claim 16, wherein a distance between the second large portion and the outer surface of the disk is less than approximately 0.8 millimeters.

19. A comb assembly for reducing cross-track motion in a disk drive, the disk drive including at least one disks, a spindle, and at least one slider assembly, the comb assembly comprising:

at least one baffle disposed upstream of the slider assemblies, the baffle having an inner surface disposed at least one millimeter outside of outer edges of the disks; and

at least one comb mounted on the baffle, wherein each comb:

disposed adjacent to at least one of the disks to provide a gap between the comb and a corresponding adjacent disk, the gap disposed in the direction of a spindle longitudinal axis and in a range from approximately 0.1 millimeter to approximately 20 millimeters;

extends radially inward from a comb outer diameter, the comb outer diameter disposed approximately at the inner surface of the baffle;

disposed upstream of the slider assemblies;

extending in a disk circumferential direction from a leading edge to a trailing edge, the leading edge disposed upstream of the trailing edge; and

extending radially inward from the baffle.

20. A disk drive assembly comprising:

a spindle adapted to rotate about a longitudinal axis;

at least one data storage disk having an outer radial edge, an outer surface, an inner radial edge, and an inner surface, the at least one disk being mounted on the spindle to rotate therewith, the outer surface and the inner surface approximately perpendicular to the longitudinal axis;

slider assemblies, each of the slider assemblies including at least one transducer head;

an actuator assembly for positioning the slider assemblies over concentric tracks disposed at different radial positions on an adjacent disk;

an enclosure element having an interior surface;

a comb attached to the interior surface; the comb:

spaced apart from the enclosure element by attachment elements,

disposed adjacent to at least one of the disks to form a gap between the comb and a corresponding adjacent disk, the gap disposed in the direction of the spindle longitudinal axis and in a range from approximately 0.1 millimeter to approximately 20 millimeters;

extending radially inward from a comb outer edge to a comb inner edge;

disposed upstream of a corresponding actuator assembly;

extending in a disk circumferential direction from a leading edge to a trailing edge,

the leading edge disposed upstream of the trailing edge; and

extending radially inward from the baffle.